## CLAIMS

We claim:

1. A fuel cell comprising a stack of unit cells, each unit cell comprising:

a hydrogen-ion conductive electrolyte membrane; an anode and a cathode with said hydrogen-ion conductive electrolyte membrane interposed therebetween; an anode-side conductive separator in contact with said anode; and a cathode-side conductive separator in contact with said cathode, wherein:

said anode-side conductive separator comprises fuel gas passage grooves, facing said anode, for supplying a fuel gas to said anode;

said cathode-side conductive separator comprises oxidant gas passage grooves, facing said cathode, for supplying an oxidant gas to said cathode; and

said fuel gas passage grooves and/or said oxidant gas passage grooves have an equivalent diameter of not smaller than 0.79 mm and not larger than 1.3 mm per each groove.

2. The fuel cell in accordance with claim 1, wherein said fuel gas passage grooves and/or said oxidant gas passage grooves have a depth of not less than 0.7 mm and not more than 1.1 mm.

3. The fuel cell in accordance with claim 1, wherein said fuel gas passage grooves and/or said oxidant gas passage grooves:

travel in a serpentine line extending from upstream toward downstream;

comprise a plurality of horizontal parts which are mutually parallel and have substantially the same length "a"; and

have a ratio of said length "a" to a shortest linear dimension "b", between a most-upstream-side horizontal part among said plurality of horizontal parts and a most-downstream horizontal part among the said plurality of horizontal parts, which satisfies the relationship: $a/b \leqq 1.2$.

4. The fuel cell in accordance with claim 1, wherein said fuel gas passage grooves and/or said oxidant gas passage grooves:

travel in a serpentine line extending from upstream toward downstream;

comprise a plurality of horizontal parts which are mutually parallel and have substantially the same length "a"; and

have a ratio of a width "c" of ribs between said mutually adjacent horizontal parts to said length "a", which satisfies the relationship: $1/200 \leqq c/a \leqq 1/20$.

5. The fuel cell in accordance with claim 1, wherein each of said anode and said cathode comprises a gas diffusion layer and a catalyst reaction layer in contact with said gas diffusion layer, and at least one of said gas diffusion layers of said anode and said cathode has a thickness of about 100 to 400 μm.

6. The fuel cell in accordance with claim 1, wherein each of said anode and said cathode comprises a gas diffusion layer and a catalyst reaction layer in contact with said gas diffusion layer, and at least one of said gas diffusion layers of said anode and said cathode has a gas permeability in a direction parallel to a major surface of the gas diffusion layer, on a dry gas basis, of about $2 \times 10^{-8}$ to $2 \times 10^{-6}$ $m^2/(pa \cdot sec)$.

7. A method of operation of the fuel cell in accordance with claim 1, wherein at least one of a fuel gas flowing along said fuel gas passage grooves and an oxidant gas flowing along said oxidant gas passage grooves has a pressure loss of not smaller than 1.5 kpa and not larger than 25 kpa.

8. A method of operation of the fuel cell in accordance with claim 1, wherein a ratio of a flow rate "f" of an underflow gas flowing in said anode to a flow rate "e" of a fuel gas flowing along said fuel gas passage grooves satisfies the relationship: $0.05 \leqq f/e \leqq 0.43$.

9. A method of operation of the fuel cell in accordance with claim 1, wherein a ratio of a flow rate "h" of an underflow gas flowing in said cathode to a flow rate "g" of an oxidant gas flowing along said oxidant gas passage grooves satisfies the relationship: $0.05 \leqq h/g \leqq 0.43$.

10. A method of operation of the fuel cell in accordance with claim 1, which further comprises providing the fuel cell with cooling medium passage grooves, wherein a temperature of an inlet of said cooling medium passage is about 45 to 75 ℃, a dew point of at least one of the fuel gas and oxidant gas to be supplied to said fuel cell is not lower than about –5℃ and not higher than about +5℃ relative to said inlet temperature, a utilization rate of the oxidant gas is not lower than about 30% and not higher than about 70%, and a power generation current density of said fuel cell is not lower than 0.05 a/cm$^2$ and not higher than 0.3 a/cm$^2$.